



CALIFORNIA
ENERGY
COMMISSION

GRANT SOLICITATION

PON-08-003 **Energy-Related Environmental** **Research Relevant to** **California**

Subject Area: PIER Environmental
Research Area

APPLICATION
PACKAGE

November 2008



Arnold Schwarzenegger, Governor

TABLE OF CONTENTS

1.	RELEASE DATE: DECEMBER 8 TH , 2008	1
2.	PROPOSAL DUE DATE: JANUARY 28 TH , 2009 4:00 P.M. PST	1
3.	PURPOSE	1
4.	AVAILABILITY OF SOLICITATION DOCUMENTS AND INFORMATION..	1
5.	BACKGROUND: PIER ENVIRONMENTAL RESEARCH AREA.....	2
6.	ELIGIBLE PROJECTS.....	2
7.	FUNDING INFORMATION	3
8.	ELIGIBLE APPLICANTS	3
9.	PAYMENT OF PREVAILING WAGES.....	4
10.	APPLICANTS' RESPONSIBILITIES FOR SUBMITTING A PROPOSAL ...	4
11.	CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA).....	5
12.	PROPOSAL REQUIREMENTS.....	5
13.	PROPOSAL GUIDELINES.....	6
14.	SELECTION OF PROJECTS AND AWARD PROCESS.....	7
15.	SCHEDULE OF PROPOSAL AND AWARD PROCESS.....	9
16.	CONFIDENTIAL INFORMATION.....	9
17.	PROPOSAL WORKSHOP.....	9
18.	PROPOSAL SUBMISSION REQUIREMENTS	10
19.	GROUND FOR REJECTION	11

20.	AMENDMENT OR CANCELLATION OF THIS SOLICITATION	11
21.	QUESTIONS	12
22.	EXHIBITS	12

Grant Solicitation and Application Package

Energy-Related Environment Research Relevant to California

Public Interest Energy Research (PIER) Subject Area: Environmental Research Area

- 1. Release Date:** December 8th, 2008
- 2. Proposal Due Date:** January 28th, 2009 4:00 p.m. PST

3. Purpose

The purpose of this solicitation is to select the Applicants best qualified to carry out public interest research on the interaction of energy generation, transmission and use and the environment in California. The goal of the Public Interest Energy Research - Environmental Research Area (PIER-EA) is to develop cost-effective approaches to evaluating and resolving the environmental effects of energy production, delivery and use in California. Each of the four research topics covered in this solicitation represents a major variable in the overall picture of environmentally focused energy research in a California context. Research funded by this solicitation will contribute toward a more comprehensive understanding of the relationship between energy generation and distribution and its impact on California's environment.

4. Availability of Solicitation Documents and Information

This solicitation and all supporting documents and forms can be found at <http://www.energy.ca.gov/contracts/index.html> under "Current Solicitations." Interested parties may also register on the electronic mailing list on this webpage to receive notifications related to this solicitation.

For those parties without internet access, copies of solicitation documents and information can be obtained by contacting:

Sandra Fromm
Energy Systems Research
California Energy Commission
1516 Ninth Street, MS-43
Sacramento, CA 95814
Telephone: (916) 653-9355
Fax: (916) 654-4872
Email: sfromm@energy.state.ca.us

In addition, you may request to be added to the California Energy Commission mailing notification list to receive information regarding this solicitation.

5. Background: PIER Energy-Related Environmental Research Area

In 1996, Governor Wilson signed into law Assembly Bill (AB) 1890 (1996 California Statutes, Chapter 854) which provided authority for a fundamental restructuring of California's electric services industry. Among other things, AB 1890 added Section 381 to the Public Utilities Code, requiring that at least \$62.5 million be collected annually from investor-owned electric utility ratepayers for "public interest" energy research, development and demonstration efforts not adequately provided by competitive and regulated markets. The Energy Commission administers these funds through the PIER program.

The mission of the PIER program is to conduct public interest energy research that seeks to improve the quality of life for California's citizens by providing environmentally sound, safe, reliable and affordable energy services and products. Public interest energy research includes the full range of RD&D activities that will advance science or technology not adequately provided by competitive and regulated markets.

PIER brings new energy services and products to the marketplace and creates state-wide environmental and economic benefits. The PIER program is implemented through the following distinct program areas:

1. Buildings End-Use Energy Efficiency
2. Climate Change Program
3. Energy Innovations Small Grant Program
4. Energy-Related Environmental Research
5. Energy Systems Integration
6. Environmentally-Preferred Advanced Generation
7. Industrial/Agricultural/Water End-Use Energy Efficiency (IAW)
8. Natural Gas Research
9. Renewable Energy Technologies
10. Transportation Research

The PIER Energy-Related Environmental Research Area (PIER-EA) facilitates research in air quality, aquatic resources, terrestrial resources, and sustainable communities.¹ The goal of this research area is to provide the tools and/or scientific knowledge to avoid or mitigate environmental impacts from energy generation, transmission, and consumption. In addition to addressing suspected and documented environmental impacts of energy, PIER-EA provides basic scientific information and tools needed to understand the environmental implications of technology and fuel types to inform the R&D choices undertaken elsewhere in the PIER Program.

6. Eligible Projects

Proposals should reflect a comprehensive understanding of the current state of science in the chosen field of research. Successful proposals should clearly describe the research approach proposed for their project and demonstrate how they can build upon and improve the existing body of work including previous PIER-funded research, and clearly state what their contributions will be to the knowledge base.

¹ PIER-EA also facilitates research in the area of global climate change. However, there is no funding in this solicitation for specific climate change projects, although it's understood that research in other environmental areas most likely will relate to the topic of climate change.

Solicitation Research Topics

Research Topic 1: Air Quality
Research Topic 2: Aquatic Resources
Research Topic 3: Terrestrial Resources
Research Topic 4: Community Scale Energy Research

Please refer to the Exhibits A-1 through A-4 for further information and the Project Description for each Research Topic. Proposals that are not rejected for failing to meet the initial criteria identified in number 19-Grounds for Rejection will be evaluated and scored on their scientific value, demonstrated expertise and ability of the research team based upon publications and past research, the cost merits of the proposal, and other factors specified in this manual. Each proposal must relate to only one of the four research topic areas.

7. Funding Information

A total of up to \$4,250,000.00 for the four research topics is available to fund projects under this competitive solicitation. Funding for this solicitation originates from the Energy Commission's 2007/08 and from the 2008/09 PIER Electricity Research Program. Match funding is strongly encouraged for all Research Topics, and **required** at a minimum level of 15% of the total project cost for Research Topic 2, please see research topic area and scoring criteria for details. Match funding can be cash or in kind. In kind match is any costs incurred working on the project that can be documented, and will need to be documented as completely as those requesting reimbursement.

The Energy Commission reserves the right to condition, modify, or otherwise limit any and all PIER funding contained in and awarded pursuant to this solicitation.

Research Topic 1:	Air Quality (\$500,000) (Proposals may request up to \$500,000)
Research Topic 2:	Aquatic Resources (\$1,000,000) (Proposals may request between \$100,000 and \$500,000)
Research Topic 3:	Terrestrial Resources (\$2,250,000) (Proposals may request between \$100,000 and \$750,000)
Research Topic 4:	Community Scale Energy Research (\$500,000) (Proposal may request between \$75,000 and \$500,000)

8. Eligible Applicants

This is an open solicitation seeking proposals from public and private entities and individuals actively involved in energy-related environmental research. To be eligible, Applicants must present a team with demonstrated capabilities in successful completion of research projects.

Each proposal must identify a Principal Investigator. A person may only serve as a Principal Investigator in one proposal per topic area. There are no other restrictions on the number of proposals that can be submitted. This means, for example, that a business, university, national lab, or other organization could submit one proposal to each topic area using the same Principal Investigator and/or could submit multiple proposals to the same topic area using different Principal Investigators.

For purposes of this solicitation, a Principal Investigator is someone who has the qualifications and appropriate level of authority and responsibility within an organization to lead the proposed research. The Energy Commission, through the scoring committee, reserves the right at its sole discretion to determine whether a person is appropriately listed as the Principal Investigator.

Regardless of whether Bidders submit one proposal in separate topic areas with the same Principal Investigator or multiple proposals within the same topic area with different Principal Investigators, each proposal must be submitted separately, adhering to all the requirements contained in the Application Manual.

California business entities as well as non-California business entities conducting intrastate business in California are required to register and be in good standing with the California Secretary of State to enter into an agreement with the Energy Commission. If not currently registered with the California Secretary of State, Applicants are encouraged to contact the Secretary of State's Office as soon as possible to avoid potential delays in beginning the proposed project if your application is successful. For more information, contact the Secretary of State's Office via their website at www.sos.ca.gov.

9. Payment of Prevailing Wages:

Some projects under this solicitation might be considered public works pursuant to the California Labor Code. If the project is a public work, prevailing wage is required. The California Department of Industrial Relations (DIR) has jurisdiction to decide whether a particular project is or is not a public work. If your project involves construction, alteration, demolition, installation, repair or maintenance work, it probably would be considered by DIR to be a public work. A few of the activities that would probably lead DIR to find that the project involves public works include: cement work, site preparation such as grading, surveying, electrical work such as wiring, and carpentry work. Certain workers are entitled to prevailing wage such as operating engineers, surveyors, carpenters, laborers, etc. However, other trades are not entitled to prevailing wage such as engineers and project superintendents.

Applicants are encouraged to determine if the proposed project involves public works as soon as possible. In order to determine if the proposed project involves public works, you will need to contact DIR. If the Applicant has not received a determination from DIR that the project is not a public work, your budget must provide for the payment of prevailing wages. Please indicate whether the proposed budget includes prevailing wage.

If the proposed project is a public work, DIR maintains a list of covered trades and the applicable prevailing wage. The grant agreement will include the requirements for a public works project, such as paying prevailing wage, keeping payroll records, complying with working hour requirements, and apprenticeship obligations. See the sample terms and conditions, the Special Condition regarding Prevailing Wage, and the accompanying forms for more information.

For detailed information about prevailing wage and the process to determine if the proposed project is a public work, see Exhibit F.

10. Applicants' Responsibilities for Submitting a Proposal

Applicants must take responsibility to:

- Carefully read this entire Application Manual and all applicable amendments/addendums.
- Ask the appropriate questions prior to the deadline to submit questions.
- Submit all required responses in a complete manner by the required date and time.
- Make sure that all procedures and requirements of the Application Manual are followed and appropriately addressed.
- Carefully reread the entire Application Manual and all applicable amendments/addendums before submitting a Proposal.

11. California Environmental Quality Act (CEQA)

Some of the projects selected for funding may meet the definition of a “project” for purposes of CEQA (see Public Resources Code section 21000 et seq.). If this occurs, the Energy Commission’s Legal Staff will review the projects to determine whether an exemption applies that would prevent further actions under CEQA. If no exemption applies, certain CEQA requirements (e.g., preparation of a negative declaration or environmental impact report) will have to be met prior to the Energy Commission approving the grant. The Applicant will have to pay the cost for these activities. Please refer to Title 20, California Code of Regulations, Chapter 6, Article 1, including section 2308.

12. Proposal Requirements

It is required that proposals contain the following elements. ***Failure to include these elements WILL result in your proposal receiving a lower score and MAY result in your proposal being rejected and not eligible for funding.***

1. Cover Sheet including: Principle Investigator's name, project title, the applying entity's legal name as registered with the Secretary of State of California, physical address, telephone number, fax number and email address, the topic area being addressed and a summary of the proposed budget request. The cover sheet must be signed, complete and accurate. (See Exhibit J).
2. An Executive Summary of the project. The maximum length of the Executive Summary is two (2) pages. The Executive Summary will include project description; project objective; quantitative and measurable goals to be achieved; project duration and date of completion (the earliest possible start date will be June 2009); amount of PIER funding requested; and total project budget.
3. Description of the state-of-the-science of the proposed research approach and the current status of the research in the area of your project, barriers to advancement of the science and why your project is the next logical step to advance the state-of-the-science. Fully discuss why this project needs to be done, and what you anticipate accomplishing.
4. A Work Statement with a task-by-task description of your project. Include at least one goal for each task, a list of the activities to be performed, product(s) to be produced, and the duration of the task. Please see and follow the format of the attached Statement of Work template (Exhibit C). For the purpose of the

application the Statement of Work may begin with Task 1.8 skipping the Administrative Tasks since they will not change.

5. Short biographies of the Principal Investigator (PI) and key research partners (individuals in your organization or subcontractors), emphasizing experience related to activities to be performed in the project. Please attach a list of relevant peer reviewed publications.
6. Detailed project budget information, including the source(s) of match funding, if any. Include the forms in Exhibit D: 1) Category Budget; 2) Budget Details; 3) Summary Budget by Task; 4) PIER Funding by Task; and 5) Match Funding by Task. This budget form is an Excel spreadsheet. It is posted on the Energy Commission website at <http://www.energy.ca.gov/contracts/index.html> as part of this solicitation package.
7. Include any other significant factors to enhance the value of the proposal, such as highlights of the previous work and innovative features related to the proposed project.
8. California-Based Entity (CBE) Preference Points Questionnaire (optional): Applicants meeting the criteria of a California-Based Entity (CBE) may have preference points added to their final technical score, subject to certain restrictions. Please see Exhibit I for more information. Eligible applicants must request and demonstrate eligibility by filling out and submitting as part of the proposal package the questionnaire contained in Exhibit I. Otherwise eligible applicants who do NOT submit the Exhibit I questionnaire shall NOT be eligible for the CBE Preference Points.

13. Proposal Guidelines

Proposals should adhere to the following guidelines. ***Failure to adhere to these guidelines MAY result in your proposal being rejected and not eligible for funding.***

1. Limit proposals to a maximum length of twenty (20) pages, excluding resumes, Statement of Work (Exhibit C), and budget (Exhibit D).
2. Provide hard copies of one (1) original and five (5) copies of the proposal and a CD containing all the documents related to the proposal. The documents do not need to be bound; binder clips are acceptable. The original must be signed by an authorized representative of your organization. The electronic copies of the documents must be in Microsoft Word and Excel or compatible formats.
3. Use a standard 12-point font and 1-inch or larger page margins and number the pages.
4. Project duration cannot exceed the duration specified in the applicable Research Topic Exhibit included in this solicitation.
5. All project expenditures (match share and reimbursable) must be expended within the approved term of the funding agreement.

6. PIER funding requests per project cannot be less than the minimum funding amount nor exceed the maximum funding amount specified in each Research Topic attached.
7. The budget should allow for the expenses of a Kick-off Meeting, at least one Critical Project Review meeting, and a Final Meeting. It is anticipated that meetings will be conducted at the Energy Commission located in Sacramento, CA or via WebEx or telephone conference. A presentation on the research at the Energy Commission may be required. The Energy Commission will request the researchers to produce a project fact sheet at the beginning of the grant agreement that will be revised to reflect study results at the end of the agreement. Budget should anticipate expenses to participate in one to two conferences, a presentation at the Energy Commission and at least one fact sheet production.
8. The budgets should allow for the preparation and submission of monthly or quarterly progress reports (at least 2-4 pages each) during the approved term of the agreement, and a peer-reviewed (minimum of three reviewers) final report that follows Energy Commission guidelines which can be found at: <http://www.energy.ca.gov/contracts/pier/contractors/index.html>.
9. The purchase of equipment (items with a unit cost greater than \$5,000 and a useful life greater than one year) with PIER funds is discouraged due to disposition requirements associated with the equipment. There are no disposition requirements for equipment purchased with match share funding.
10. The budget must reflect estimates for **actual** costs to be incurred during the approved term of the project. The Energy Commission can only approve and reimburse expenditures for actual costs that are properly documented in accordance with the PIER Grant Terms and Conditions.
11. The budget must **NOT** include any profit from the proposed project, either as a reimbursed item or as match share. In accordance with the PIER Grant Terms and Conditions, NO PROFIT IS ALLOWED UNDER GRANT AGREEMENTS. Please review the PIER Grant Terms and Conditions for additional restrictions and requirements.
12. A signed statement that you have read and agree to the PIER Grant Terms and Conditions (statement included in the Cover Sheet Exhibit J).

14. Selection of Projects and Award Process

The following process will be utilized to recommend project(s) for funding:

1. Based on the proposals submitted, a scoring committee will score the projects using the scoring criteria described in Exhibit B.
2. The scoring committee may conduct optional interviews for clarification purposes.

3. A minimum score of 17 (out of 25) on the first technical evaluation criteria- Proposal Responds to Specific Overall Scope of Work-is required to be eligible for funding.
4. A minimum score of 70 (out of 100) is required to be eligible for funding.
5. Projects receiving a score of 70 or more will be ranked according to their overall score.
6. Passing project(s) in each research topic area will be recommended for funding starting with the highest ranked project until all funds allocated for that research topic area are exhausted or until there is not enough funds to fully fund the next highest ranked passing proposal in that topic area. The Energy Commission reserves the right, at its sole discretion, to transfer excess funds from one topic area to other research topic area(s) covered by this solicitation in order to fund additional proposals that have received a passing score.
7. The Energy Commission reserves the right to negotiate with the Applicant(s) to modify the project scope, level of funding, or both.
8. If the Energy Commission is unable to successfully negotiate and execute a funding agreement with an Applicant, the Energy Commission, at its sole discretion, reserves the right to cancel the pending award and fund the next highest ranked eligible project proposal received under this solicitation.
9. A Notice of Proposed Awards will be released.
10. Public agencies and non-profit organizations that receive funding under this solicitation must provide an authorizing resolution approved by their governing authority to enter into an Agreement with the Energy Commission.
11. A Grant Agreement, which includes applicable Terms and Conditions*, will be written and sent to the Recipient(s) for review, approval, and signature.
12. The completed agreement will be taken to the Energy Commission Business meeting for approval.
13. Once all parties have approved the agreement it will be finalized and executed. Recipient(s) are approved to begin the project only after full execution of the Grant Agreement.

* ***The PIER Grant Terms and Conditions can be found at <http://www.energy.ca.gov/contracts/index.html> as part of this solicitation package. Please note, however, the Energy Commission reserves the right to modify the terms and conditions prior to executing grant agreements.***

15. Schedule of Proposal and Award Process

Release of Program Opportunity Notice	December 8, 2008
Proposal Workshop (via in-person participation, teleconference and WebEx)	January 6, 2009
Deadline to Submit Questions	January 7, 2009
Post Questions and Answers to Website	January 14, 2009
Deadline to Submit Proposals	January 28, 2009 4:00 p.m. PST
Interview Applicants (if necessary)	Estimated week of February 16, 2009
Post Notice of Proposed Award	Estimated March 9, 2009
Approval of Awards at Energy Commission Business Meeting	Estimated June-July 2009

16. Confidential Information

No confidential information will be accepted during the proposal and selection phase of this solicitation. If any confidential information is submitted, the entire proposal will be rejected and will not be eligible for funding. Proposals containing confidential information will be returned to the Applicant.

Generally, the use of confidential information will also not be accepted as part of projects that are funded. Please refer to the terms and conditions (see Exhibit E or <http://www.energy.ca.gov/contracts/index.html> for Terms and Conditions).

17. Proposal Workshop

A proposal workshop will be held through in-person participation, WebEx, and conference call. Participation by prospective Applicants is optional. Please call (916) 551-1337 or refer to the Energy Commission's website at <http://www.energy.ca.gov/contracts/index.html> to confirm the date and time.

Public participation may be done in-person, via WebEx, and/or conference call.

Date: January 6, 2009
Time: 10:00 am, Pacific Standard Time
Location: California Energy Commission
Hearing Room B, First Floor
1516 Ninth Street
Sacramento, California 95814

To join the WebEx meeting, click the following link and enter the meeting number and password provided below:

Topic: PIER Environmental Research Area – Solicitation Workshop
Date: Tuesday, January 6, 2009
Time: 10:00 am, Pacific Standard Time (GMT -08:00, San Francisco)
Meeting Number: 920 565 728
Meeting Password: meeting@10am

To join the online meeting

1. Go to
<https://energy.webex.com/energy/j.php?ED=110316552&UID=0&PW=edc58c59504844500a0b2b575a0d06>
2. Enter your name and email address.
3. Enter the meeting password: meeting@10am
4. Click "Join Now".

Teleconference information

Provide your phone number when you join the meeting to receive a call back. Or, call the number below and enter the meeting number.

Call-in toll-free number (US/Canada): 866-469-3239

Call-in toll number (US/Canada): 1-650-429-3300

Global call-in numbers:

<https://energy.webex.com/energy/globalcallin.php?serviceType=MC&ED=110316552&tollFree=1>

Toll-free dialing restrictions: http://www.webex.com/pdf/tollfree_restrictions.pdf

For assistance

1. Go to <https://energy.webex.com/energy/mc>
2. On the left navigation bar, click "Support".

To update this meeting to your calendar program (for example Microsoft Outlook), click this link:
<https://energy.webex.com/energy/j.php?ED=110316552&UID=481350752&ICS=MIU1&LD=1&RD=2&ST=1&SHA2=Bn75FwXwj9PNHAOctzm9t929m766m6pFtBsbFHCzX34=>

To check whether you have the appropriate players installed for UCF (Universal Communications Format) rich media files, go to
<https://energy.webex.com/energy/systemdiagnosis.php>

<http://www.webex.com>

We've got to start meeting like this(TM)

18. Proposal Submission Requirements

Proposals must be **received** by the Energy Commission's Grants and Loans Office by **4:00 p.m. (PST) on January 12, 2009**. Proposals must be mailed or delivered to:

California Energy Commission
Grants and Loans Office
Attn: PIER Energy-Related Environmental Research Grant Program
1516 Ninth Street, MS-1
Sacramento, CA 95814

Postmark dates of mailing, electronic mail (E-mail), and facsimile (Fax) transmissions are not acceptable in whole or in part under any circumstances. The Energy Commission will reject all proposals not received by the Energy Commission's Grants and Loans Office by the stated due date and time.

19. Grounds for Rejection

Proposals **WILL** be rejected and not considered for funding if:

1. The proposal is not received by the Energy Commission's Grants and Loans Office by the stated due date and time.
2. The proposal does not clearly state which Research Topic area, as defined under "Eligible Projects," is addressed by your proposal.
3. The proposal contains confidential information.
4. The proposal proposes a project that has already been addressed or is being addressed.
5. The proposal is not for a distinctly separate project from other proposals submitted by the same Applicant.
6. Multiple proposals are submitted under a single research topic area using the same Principal Investigator. If this occurs, all of the proposals submitted under that research topic area using that Principal Investigator will be rejected.
7. The proposal relates to more than one of the four research topic areas.
8. The proposal addresses regulatory requirements that should be borne by the permit applicant.
9. The proposal is in Topic Area 2 and does not show the required match in the budget.

Proposals **MAY** be rejected and not considered for funding if:

1. The proposal does not address each element listed under "Proposal Requirements."
2. The proposal does not adhere to the guidelines listed under "Proposal Guidelines."

20. Amendment or Cancellation of this Solicitation

The Energy Commission reserves the right to do any of the following:

- Cancel this solicitation.
- Amend or revise this solicitation as needed.

- Reject any or all proposals received in response to this solicitation.

21. Questions

Questions about this solicitation must be received by January 7, 2009 and may be submitted by email or letter. The questions and answers will be posted on the Energy Commission's website by January 14, 2009. Questions may be directed to:

Joe O'Hagan
Project Manager
PIER Environmental Area
California Energy Commission
1516 Ninth Street, MS-43
Sacramento, CA 95814
Email: johagan@energy.state.ca.us

For those parties without internet access, copies of the questions and answers can be obtained by contacting:

Sandra Fromm, Supervisor
Energy Systems Research
California Energy Commission
1516 Ninth Street, MS-43
Sacramento, CA 95814
Telephone: (916) 653-9355
Email: sfromm@energy.state.ca.us

22. Exhibits

- A. Research Topics 1 - 4
- B. Scoring Criteria
- C. Sample Work Statement Format and Instructions
- D. Budget Forms
- E. PIER Terms and Conditions with Payment Request Form
- F. Prevailing Wage Special Condition Template
- G. Prevailing Wage Compliance Certificate
- H. Prevailing Wage Compliance Qs & As
- I. California-Based Entity (CBE) Preference Points Questionnaire (optional)

Exhibit A-1

Research Topic 1

Air Quality Research

I. Background Information

California currently has a Renewables Portfolio Standard (RPS), which requires electric utilities to increase the use of renewable generation to 20 percent of retail electricity sales by 2010. The Governor and the state's energy agencies have identified a further target of 33 percent renewable generation by 2020, which the California Air Resources Board (ARB) has identified as a key strategy for meeting the state's aggressive greenhouse gas (GHG) emission reduction target of 1990 levels by 2020. A major barrier to meeting the 33 percent goal is how to integrate large amounts of variable and intermittent renewable resources, such as wind and solar, into California's electricity system. These technologies pose challenges to traditional reliability planning and resource adequacy requirements because they cannot be relied on to meet rapid changes in load and supply during peak hours and generally must be backed up with dispatchable resources. Geothermal and biomass power plants provide reliable, baseload power and can be integrated into the system without any additional backup. However, adding large amounts of any type of renewables to the system can still be problematic because California's local reliability requirements require load to be met primarily with local resources, and many renewable resources are located outside the state's ten load centers. As a result of this combination of the intermittent nature of some renewable resources plus their remote location, control area operators will need increased flexibility via access to other resources such as hydro generation, dispatchable pump loads, energy storage systems, fast-ramping and fast-starting fossil fuel generation and other similar resources. There is a critical need for California to analyze the air quality implications of such a future.

II. Project Description

The Public Interest Energy Research (PIER) Program is soliciting proposals that will initiate one or more in-depth studies that examine air quality implications in California of meeting the Renewable Portfolio Standard of 20 percent renewable energy by 2010 and the goal of 33 percent by 2020 while maintaining system reliability and a properly functioning wholesale power market. Projects should demonstrate how renewable energy technologies can be implemented in accordance with the renewable portfolio standards and goals with the minimal adverse impact to air quality within California and maintain system reliability. For example, this research could consist of a series of scenarios to evaluate how the increased electricity demand of the state may be met in the future and to determine how to reduce potential adverse air quality impacts. Proposed research should include consideration of various types of renewable energy, effects of ageing and environmental restrictions on power plants, distributed generation, renewable generation out-of-state to meet RPS goals, transmission limitations and interactions with the western power grid. Proposers should also demonstrate their knowledge of past and existing related projects such as the Renewable Energy Transmission Initiative (RETI), the Western Wind and Solar Integration Study (National Renewable Energy Laboratory) and the

Intermittency Analysis Project² funded by the California Energy Commission and how results of these projects will be used in the proposed project. The proposals should indicate how the researchers will identify implementation barriers and options to overcome those barriers.

III. Relevance to the PIER Program

The mission of the PIER program is to conduct public interest energy research that seeks to improve the quality of life for California citizens by providing environmentally sound, safe, reliable and affordable energy services and products. The mission of PIER Environmental Area is to conduct research that seeks to evaluate and resolve energy-related impacts to the environment. The portfolio of research products delivered from this solicitation will contribute to the overall goals of the Energy Commission, the PIER program, and the PIER Environmental Area's objective to analyze the effects of energy generation and use on California's air quality.

IV. Project Term

Maximum of one year.

V. Maximum Amount of Funds Available

A total of \$500,000 is available under this research topic. Proposals may not exceed this amount.

VII. Matching Funds and/or Shared Costs

Match share costs (cash and in kind) are strongly encouraged and should be clearly designated in the proposal budget. Please include a brief write-up of any existing or potential matching funds and/or shared costs in the Budget Narrative section of the application. Indicate if the funds/costs are existing or potential.

² CEC, Intermittency Analysis Project: Final Report, CEC-500-2007-081, July 2007

Exhibit A-2

Research Topic 2 Aquatic Resources Research

I. Background Information

A significant portion of California hydropower generation capacity will be subject to relicensing by the federal Energy Regulatory Commission (FERC) within the next decade. Given that these licenses are for 30 to 50 years, there is a need to make the FERC relicensing process more efficient and effective in enhancing environmental protection while avoiding the unnecessary curtailment of hydropower generation.

For virtually all hydropower facilities in the state located on streams or rivers going through the FERC relicensing process, protection of downstream water quality, specifically water temperature, dissolved oxygen and suspended sediment is a major concern. Stream and river water temperatures, in particular are a critical water quality factor that affects all freshwater aquatic organisms. Water temperatures not only directly affect the survival, growth rates, behavioral and life-history traits of aquatic species, but indirectly, also affect the occurrence of disease and predation. Downstream water temperatures are closely tied to the amount and timing of water flows. In fact, there is a need for a greater emphasis on water temperatures in determining appropriate flows to protect aquatic species. Therefore, the focus of this topic will be on research addressing the interaction of flow manipulations from hydropower operations with downstream water temperatures and their effect on aquatic biota and habitats.

For example, existing temperature models address mean water column temperatures but do not address the occurrence of thermal refugia or lateral and vertical temperature variations. As the number of “managed species” addressed during the relicensing process increase, there is a need to understand their temperature preferences and tolerances and how this affects habitat suitability. Development and enhancement of indices to improve assessment and monitoring of project effects on water temperatures are also needed. As an example, several life stages of the foothill yellow-legged frog (*Rana boylei*) are sensitive to water flow and temperature variations along stream margins, areas not adequately captured in standard instream flow or temperature models. The PIER EA program has funded research on this and is in process of funding additional research on this topic. Therefore, proposals on the foothill yellow-legged frog will not be accepted. Another topic may be research on thermal shocks where repeated rates of temperature changes are harmful to aquatic life. There are certainly many other issues worthy of research than covered in this brief discussion.

II. Project Description

PIER is soliciting two or more proposals for research that will address and resolve the adverse effects of hydropower-induced water temperature effects on aquatic species and habitats in California.

Proposals must clearly be aimed at informing downstream water temperature effects on aquatic species and habitats addressed during the Federal Energy Regulatory Commission’s (FERC) hydropower relicensing process. This means that proposal must identify cost effective tools that will be embraced by the relicensing process. The proposals should clearly demonstrate how the

research results will advance science and/or technology not adequately provided for by competitive and regulated market (i.e., the FERC relicensing process) and that will result in public benefit. The proposals should also identify barriers to implementation and options to overcome those barriers. In addition, proposed research should be applicable to a range of localities; that is, it should not be only applicable to a single site-specific situation.

III. Relevance to the PIER Program

The mission of the PIER program is to conduct public interest energy research that seeks to improve the quality of life for California citizens by providing environmentally sound, safe, reliable and affordable energy services and products. The mission of PIER Environmental Area is to conduct research that seeks to evaluate and resolve energy-related impacts to the environment. The portfolio of research products delivered from this research topic will contribute to the overall goals of the Energy Commission, the PIER program, and the PIER Environmental Area's objective to reduce the negative effects of hydropower on California's freshwater ecosystems while avoiding the unnecessary curtailment of hydropower generation.

IV. Project Term

Maximum of three years.

V. Funds Available

A total of \$1,000,000 is available under this research topic. Each proposal must request no less than \$100,000 and no more than \$500,000.

VI. Matching Funds and/or Shared Costs

Match share costs (cash and in kind) are required at a minimum of 15% of the total project cost and should be clearly designated in the proposal budget. Please include a brief write-up of any existing or potential matching funds and/or shared costs in the Budget Narrative section of the application. Indicate if the funds/costs are existing or potential. Potential match will not be counted towards the 15% required match.

Exhibit A-3 Research Topic 3

Terrestrial Resources Research: Avian and Wildlife Interactions with Utility Systems

I. Background Information

Many species of birds and bats collide with, or are electrocuted by, energy utility structures such as distribution poles and lines, transmission lines, and wind turbines. These interactions kill birds, disrupt power supply, damage electrical equipment, and increase permit requirements and processing time. The goal of this research objective is to evaluate, reduce, or resolve such negative interactions.

PIER has developed four research plans, or roadmaps, and sponsored several research projects on this topic (see <http://www.energy.ca.gov/research/environmental/index.html>). The four roadmaps are:

1. A Roadmap for PIER Research on Avian Power Line Electrocution in California (P500-02-072F)
2. A Roadmap for PIER Research on Avian Collisions with Power Lines in California (P500-02-071F)
3. A Roadmap for PIER Research on Avian Collisions with Wind Turbines in California (P500-02-070F)
4. A Roadmap for PIER Research on Methods to Assess and Mitigate Impacts of Wind Energy Development on Birds and Bats in California (CEC-500-2008-076)

While many research projects have addressed the research strategies outlined in these roadmaps, many issues remain unresolved or results are inconclusive. (These reports are available at: http://www.energy.ca.gov/research/reports_pubs.html). For example, some research tested the effectiveness of using devices placed on conductors intended to increase line visibility and divert flying birds from hitting the line had mixed results based upon the diverter used or location tested. In other cases, diverters degraded quickly. More research is needed in this area to examine both effectiveness and longevity of diverters. Similarly, research conducted on relationships between pole designs and bird electrocution or on protocols to document bat use at wind development sites would benefit from follow-up studies to validate models by independent parties or from increasing seasonal or locational samples. It is important to build upon these studies as well as continue to initiate new studies on remaining research gaps identified in the roadmaps.

The Energy Commission and California Department of Fish and Game recently released *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines)* in October 2007 to provide recommended protocols for assessing and minimizing impacts from wind energy development to birds and bats. However, some uncertainty remains as to the best methods for assessing and monitoring wind energy project impacts. Therefore, in 2008 PIER developed a roadmap that identifies research needed to help resolve those uncertainties.

II. Project Description

PIER is soliciting proposals that initiate several studies to address and resolve the bird and bat impacts from collision and electrocution with utility structures. The proposals should address outstanding issues identified in Roadmaps 1, 2, or 4 listed above. Proposals should clearly demonstrate the importance of the research to inform state policy goals - including the Integrated Energy Policy Reports, State Energy Action Plans, and Senate Bill 1250- 2006 and environmental mandates. The proposals should clearly demonstrate how the outcome will advance science and/or technology not adequately provided for by the competitive and regulated energy market and that will result in public benefit. The proposals should also indicate how the researchers will identify implementation barriers and options to overcome those barriers.

III. Relevance to the PIER Program

The mission of the PIER program is to conduct public interest energy research that seeks to improve the quality of life for California citizens by providing environmentally sound, safe, reliable and affordable energy services and products. The mission of PIER Environmental Area is to conduct research that seeks to evaluate and resolve energy-related impacts to the environment. The portfolio of research products delivered from this solicitation will contribute to the overall goals of the Energy Commission, the PIER program, and the PIER Environmental Area's objective to reduce negative interactions between utility structures and California's cherished avian and wildlife species, while improving energy reliability and costs to the rate payers.

IV. Project Term

Up to a maximum of 4 years.

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V. Funds Available

A total of \$2,250,000 is available under this research topic. Proposal must request no less than \$100,000 and no more than \$750,000.

VI. Matching Funds and/or Shared Costs

Match share costs (cash and in kind) are strongly encouraged and should be clearly designated in the proposal budget. Please include a brief write-up of any existing or potential matching funds and/or shared costs in the Budget Narrative section of the application. Indicate if the funds/costs are existing or potential.

VII. References

California Integrated Policy Reports
State Energy Action Plans
California Senate Bill 1250 - 2006
A Roadmap for PIER Research on Avian Power Line Electrocution in California (P500-02-072F)

A Roadmap for PIER Research on Avian Collisions with Power Lines in California (P500-02-071F)

A Roadmap for PIER Research on Avian Collisions with Wind Turbines in California (P500-02-070F)

A Roadmap for PIER Research on Methods to Assess and Mitigate Impacts of Wind Energy Development on Birds and Bats in California (CEC-500-2008-076, in press).

Exhibit A-4 Research Topic 4

Community Scale Energy Research

I. Background Information

California has experienced many decades of unsustainable suburban development that partially stemmed from a combination of a thriving post World War II economy, abundant and inexpensive energy, and seemingly limitless open land ripe for development. This history has transformed California's landscape into a network of highways and residential communities located miles from employment centers, creating an economic and environmental burden in today's society. Today's soaring land and energy costs and growing population have created a need for innovative solutions to mitigate the economic and environmental impact of past unsustainable community development. Further, California needs tools and information to promote and develop new economically and environmentally sustainable communities.

The PIER Environmental Research Area's (PIER-EA) Community Scale Energy Research is striving to fill an energy research gap that has the potential to inform California policy and develop tools to help satisfy the state's ambitious energy and environmental goals and mandates. Community scale energy research is a broad, cross-cutting topic that may apply to either California's existing built environment, or to future growth and development projects. The ultimate goal is to accomplish maximum community level energy efficiency and sustainability, providing environmental and economic benefits through innovative community design concepts and strategies. This goal can be achieved through a robust research portfolio that includes an investigation into ways to reduce energy consumption at the local government level, particularly at their own facilities and operations; promotion of efficient use of energy and alternative resources in the private sector through the judicious use of incentives, regulations and demonstration projects; and, shaping local land use and development patterns in ways to reduce per capita energy use and avoiding or mitigating the impact on the natural environment.

PIER-EA's focus is to analyze and quantify the environmental impacts of sustainability research topics. Research topics can apply to either (or both) the built environment, or to future growth and development projects. While it certainly may be a component of the proposal, this solicitation is not seeking research directly analyzing methods to reduce vehicle miles traveled.

II. Project Description

PIER-EA is soliciting proposals that will initiate one or more in-depth studies that strive to meet the economic and environmental challenges facing California by reducing energy consumption and increasing and optimizing use of renewable energy technologies at the community level with innovative research in land use planning and community design. Sustainable community planning and design can be used to achieve this goal by considering the energy demands of communities before and during the early stages of the planning process. This proactive planning process will yield both significant short-term and long-term benefits. Proposals should clearly demonstrate the importance of the research to inform state policy and satisfy state energy and environmental mandates and benchmarks. The proposals should emphasize the environmental impacts, negative and/or positive, of the proposed project. One example would be tools, models or other information that would allow measurement of the environmental trade-offs

between the use of shade trees versus the use of roof-top solar panels as a means to reduce energy consumption. PIER was created to advance science and/or technology and the proposal should be clear on how it would accomplish this in the field of sustainable communities.

III. Relevance to the PIER Program

The mission of the PIER program is to conduct public interest energy research that seeks to improve the quality of life for California's citizens by providing environmentally sound, safe, reliable and affordable energy services and products. The mission of the Community Scale Energy Research Program area is designed to support the mission of the PIER program. The ultimate goal is to accomplish maximum community level energy efficiency and sustainability, providing environmental and economic benefits through innovative community design concepts and strategies. The program's research portfolio will strive to meet the goals established by the Energy Commission's 2007 Integrated Energy Policy Report³, and the policies and mandates established by the State of California, including the Renewable Portfolio Standard and the recently enacted Global Warming Solutions Act (AB 32, 2006).

IV. Project Term

Maximum of three years.

V. Funds Available

A total of \$500,000 is available under this research topic. Proposal request shall be no less than \$75,000 and may be up to \$500,000.

VI. Matching Funds and/or Shared Costs

Match share costs (cash and in kind) are strongly encouraged and should be clearly designated in the proposal budget. Please include a brief write-up of any existing or potential matching funds and/or shared costs in the Budget Narrative section of the application. Indicate if the funds/costs are existing or potential.

VII. References

California Energy Commission 2007, 2007 Integrated Energy Policy Report, CEC-100-2007-008-CMF.

California Energy Commission 2005, Sustainable Urban Energy Planning, A Roadmap for Research and Funding, CEC-500-2005-102.

³ 2007 IEPR, Ch. 8, "Mitigating Energy Needs with Smart Growth"

Exhibit B

Competitive PIER Environmental Research Grant Solicitation

Scoring Evaluation/Criteria

Proposal Scoring

Overview of the Technical Evaluation Scoring Process

Proposals must fully comply with the Proposal Requirements and follow the Proposal Guidelines to be eligible for the technical evaluation scoring by the Technical Evaluation Committee. The Technical Evaluation Committee may consist of Commission staff, staff of other agencies, private consultants and/or other designated representatives of the State to evaluate the proposals' technical merits. During the evaluation process, all proposals will be kept confidential.

Technical Evaluation Committee

Proposals that pass the initial pass/fail screening criteria (Section 19 Grounds for Rejection in the main Application Manual) according to the Proposal Requirements and Proposal Guidelines will be scored by a minimum of three technical evaluators with recognized expertise in the proposed subject area. Technical evaluators may be from academia, environmental organizations, industry, or government. The identity of the evaluators will be kept confidential.

Scoring and Selection Process

Each proposal will be scored by the Technical Evaluation Committee utilizing the following process:

1. Each Committee Member will independently score each proposal from zero (0) to ten (10) for each criterion described in the next section, based upon the information provided by the Applicant's proposal.
2. Each criterion score will then be multiplied by the specified weighting factor to obtain the weighted points for that criterion.
3. The weighted points for each proposal will be summed to provide each Committee Member's total weighted score.
4. The final score for each proposal will be the average score of all Committee Members.

Pass/Fail Criteria

A Proposal must receive a weighted minimum score of 17 out of 25 points under technical evaluation criterion number 1: **Proposal Responds to Specific Overall Scope of Work as Described in the Applicable Research Topic Exhibit**. If the score for criterion number 1 is less than 17 points, the Proposal will fail and not be funded. If a project passes the initial pass/fail criteria, a Proposal must garner a minimum of 70 points out of 100 total possible points, to pass the technical evaluation. For those proposals that pass the technical evaluation, preference points will be added for eligible California-Based Entities. Please see Exhibit I of this solicitation for more information.

Passing project(s) in each research topic area will be recommended for funding starting with the highest ranked project until all funds allocated for that research topic area are exhausted or until

there is not enough funds to fully fund the next highest ranked passing proposal in that topic area. The Energy Commission reserves the right, at its sole discretion, to transfer excess funds from one topic area to other research topic area(s) covered by this solicitation in order to fund additional proposals that have received a passing score. Recommended awards must be approved by Energy Commission Research and Development and Demonstration (RD&D Committee) AND the full Energy Commission at an Energy Commission Business Meeting.

Preference Points for California-Based Entities

Applicants meeting the criteria of a California-Based Entity (CBE) may have preference points added to their final technical score, subject to certain restrictions. Please see Exhibit I for more information. Eligible applicants must request and demonstrate eligibility by filling out and submitting as part of the proposal package the questionnaire contained in Exhibit I. Otherwise eligible applicants who do NOT submit the Exhibit I questionnaire shall NOT be eligible for the CBE Preference Points.

Scoring Scale

Each proposal will be scored on the degree to which it meets each of the Technical Evaluation Criteria, as shown in the table below.

0	Not responsive to the criterion
1-2	Response is minimal
3-4	Responds only marginally to relevant considerations under the criterion
5-6	Responds satisfactorily to most relevant considerations under the criterion
7-8	Responds satisfactorily to all relevant considerations under the criterion
9	Responds completely, accurately, and convincingly to all relevant considerations under the criterion
10	Response is complete, specific, and superior, both quantitatively and qualitatively

Technical Evaluation Criteria

The Technical Evaluation Committee will score each Proposal based on the following five Technical Evaluation Criteria:

- 1) **Proposal Responds to the Project Description as Described in the Applicable Research Topic Exhibit.** (Weighting Factor: 2.5; Maximum Weighted Score: 25)
 - Proposal's scope of research and methodology is consistent with the definition of public interest research and clearly addresses the project description identified for the chosen Research Topic.
 - Proposal convincingly justifies the significance of the proposed research/case study.
 - Proposal contains a thorough survey of the previous work in the literature, especially of the PIER-sponsored research.
 - The Proposal demonstrates the Applicant's awareness of current and prior work by others in the proposed research area.
 - Proposals with an average score of less than 17 points for this criteria will fail.
- 2) **Proposal provides Clear, Meaningful, and Measurable Objectives, Project Description, Products and Due Dates.** (Weighting Factor: 2.0; Maximum Weighted Score: 20)

- The Project Description identifies and describes clear, meaningful, and measurable objectives that will achieve the intent of the applicable Research Topic.
- The research method is appropriate for achieving the project's objectives and goals.
- The Project Description is clearly written and internally consistent in describing a reasonable, appropriate and complete effort.
- The Project Description is composed of a series of interconnected, logical, feasible and discrete efforts for accomplishing the stated objectives.

3) Budget is Reasonable and Appropriate. (Weighting Factor: 1.5; Maximum Weighted Score: 15)

- Project Budget clearly demonstrates a reasonable, appropriate and complete effort that identifies interconnected, logical, and discrete tasks consistent with the project description.
- The Work Schedule reasonably appropriates time and funds with respect to the sequences of tasks, level of effort allocated per task, and the use of labor, equipment, and facilities. If the research involves a particular environmental aspect – the schedule fits the necessary time of year to conduct the research.
- Each item of the budget is appropriate considering: (1) the significance of the issues, and/or knowledge gaps being addressed, (2) the project's objectives and goals, and (3) the level of effort described in the Project Narrative.
- The budget shows that key personnel will be committed to the project for the appropriate number of hours and functions to accomplish the tasks and products, and for the activities described in the Project Narrative.
- The budget and/or budget narrative illustrate appropriate match funding. It is appropriate both in amount and detail in the budget narrative.

4) The Principal Investigator and the Project Team are Well Qualified to Conduct the Project. (Weighting Factor: 1.5; Maximum Weighted Score: 15)

- The Applicant describes, with substantiation, the Applicant's past and current work in the research subject area. Accomplishments (not just activities) are described.
- Publishing track record in topic related peer-reviewed journals.
- The proposal convincingly demonstrates, based on education, training, and past experience that the applicant and project team are capable of conducting all technical, administrative, and budgetary functions and responsibilities, including the ability to control cost, maintain the schedule, and report results and accomplishments in an effective manner.

5) Overall technical merit and degree to which the project is likely to succeed, including a consideration of the degree to which the proposal goes beyond the basic requirements described in the applicable Research Topic Area Exhibit. (Weighting Factor: 2.5; Maximum Weighted Score: 25)

- Originality of the research idea and methodological approach.
- Importance of the study within the context of the overall scientific advancement in the given subject.
- The Proposal's research scope expands on what is suggested in the Research Topic description, thereby exploring/providing preliminary answer(s) to the next logical step for future research. To the reviewer's understanding, the likelihood that this project is

feasible and is likely to succeed in terms of satisfactory completion within the project timeframe and budget, and producing scientifically meaningful as well as policy-relevant results.